

## The Life History of *Automeris zephyria* (Saturniidae)

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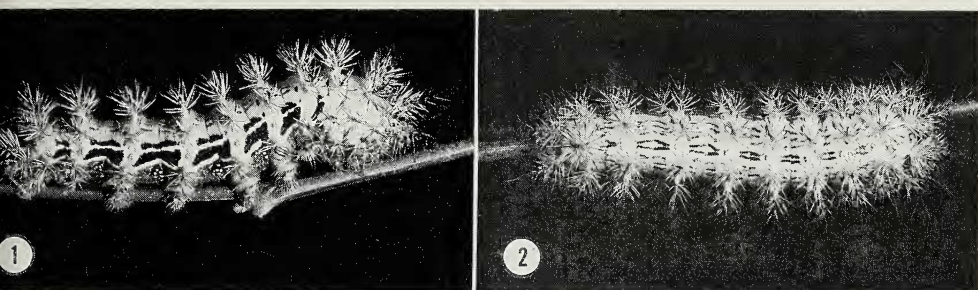
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**Abstract.** *Automeris zephyria* occurs in the mountain ranges of central New Mexico, and a small portion of western Texas. There is one generation per year, and the adult flight season extends from mid-May to mid-July. The only confirmed natural larval host plant is *Salix*. Larvae were reared to maturity on *Cercocarpus*, *Cercis*, *Prunus*, and *Quercus*. The ground color of the mature larva is primarily yellow with a thin light blue mid-dorsal line. Pupation occurs among debris on the ground during August and September.

### Introduction

*Automeris zephyria* Grote inhabits the central mountain ranges of New Mexico, south into the portion of the Guadalupe Mountains that extends into western Texas. Since its initial description in 1882 little information has been published on the biology of *zephyria*. Ferguson (1972), reviewed the available collecting data and illustrated the adults.

Adult *Automeris zephyria* are attracted to lights and have been captured from mid-May to mid-July, with most records from early to mid-June. In June 1985, *zephyria* was common at lights (34 ♂♂, 8 ♀♀, VI-8-9-1985) in High Rolls (Sacramento Mts., Otero Co. N.M., elev. 1993 m). The High Rolls habitat is a pinyon-juniper woodland, with scattered oaks representing elements of southwestern Madrean Evergreen Woodland (Brown 1982, Little 1976). Most trees are under 12 m in height and widely separated. A low growing *Salix* is a common member of the riparian habitat. Other *zephyria* habitats in the area were visited. Karr Canyon Picnic Ground (elev. 2430 m), 9.2 km S. of High Rolls, is coniferous woodland, while Pine Campground near Cloudcroft (elev. 2690 m) is Sierran Montane Conifer Forest habitat (Brown 1982). The mountain systems in New Mexico and Texas inhabited by *zephyria* (Sangre de Cristo, Sandia, Capitan, Sacramento, and Guadalupe) have sufficient elevation to contain the Sierran Montane Conifer Forest community. With the exception of Sitting Bull Falls in the Sacramento Mts. (elev. 1472 m), most locations where *zephyria* is collected exceed 1750 m.



Figs. 1-2. Mature sixth instar larva of *Automeris zephyria*: 1, lateral view; 2, dorsal view.

At High Rolls, both sexes were attracted to lights from about one hour after dark until observations ended at 0030 h. In captivity mating occurred after 2330 h ( $N = 4$ ). Pairs remained together until nearly dawn and then separated. Oviposition began the following night. Eggs were deposited in clusters on the sides of paper bags. Due to the artificial substrate the number of eggs that would be naturally deposited in a cluster is unknown.

As with all U.S. *Automeris*, the ova are white, and when fertile, develop a black dot on the top of the egg. The only confirmed natural larval food plant is an unidentified species of *Salix* (Kenneth Hansen, pers. comm.). Since 1972, we have reared larvae on four different occasions. In captivity larvae successfully developed to maturity on *Salix* sp. (willow), *Cercocarpus betuloides* Nutt. (mountain mahogany), *Cercis canadensis* L. (redbud), and four species of Oak, *Quercus phellos* L. (willow oak), *Q. nigra* L. (water oak), *Q. oblongifolia* Torr. (Mexican Blue Oak), and *Q. alba* L. (white oak). Richard Peigler has reared *zephyria* on *Prunus serotina* Ehrh. (Donahue, 1979). Upon emergence from the eggs, larvae feed gregariously. As with other *Automeris* and *Hemileuca* species larval clusters may divide and reunite numerous times during a 24 hour period. After the fourth instar larvae tended to feed singly.

Larvae mature and pupate during late August and September ( $N = 108$ ). Prior to pupation they leave the host plant and construct cocoons on the ground among debris. Based on a review of the flight data and our rearing experience, there is one generation per year. Suggestions that the two and one half month flight periods may represent two generations (Collins and Weast 1961, Ferguson 1972) appear incorrect.

### Larval Description

The larval descriptions are based on material reared from ova deposited by a female collected at the Tunnel Inn, High Rolls, Sacramento Mts., Otero Co., N.M. Twenty-three larvae from Sunspot, Otero Co. and five from Dark Canyon, Guadalupe Mts., Eddy Co., N.M. were also reared to maturity and examined.

Calipers were used to measure various characters at the end of each instar. Preserved larvae are in the collection of both authors and will be deposited in an institutional collection upon completion of larval studies.

**First instar.** Head: Diameter 1 mm. Brown with sparse short gold setae. Body: Ground color yellowish green. Length 7.5 mm, width 1.5 mm. All scoli black. Dorsal meso- and metathoracic scoli slightly enlarged and forked. Remaining scoli appear as simple shafts. Prolegs, true legs, sublateral and ventral surfaces brownish yellow.

**Second instar.** Head: Diameter 1.3 mm. Reddish brown with sparse short gold setae. Body: Ground color yellowish green and reddish brown. Length 11-12 mm, width 1.6 mm. Thoracic, caudal, and dorsal abdominal scoli black with black spines. Dorsolateral scoli reduced in size with black shaft and yellow spines. Lateral and sublateral scoli reduced in size; shafts yellow with yellow spines. Dorsal area yellowish green with brownish red mid-dorsal line. Brownish red intersegmental bars in line with dorsal scoli. Lateral surface reddish brown with two thin yellowish green lines extending length of abdomen: first passes just ventral of lateral scoli; second passes through base of sublateral scoli. Prolegs, true legs, and ventral surface, red.

**Third instar.** Head: Diameter 1.9-2.0 mm. Dark brown with short light brown setae. Body: Ground color yellow. Length 12-15 mm, width 3 mm. Dorsal scoli with black shafts and yellow and black spines. Dorsolateral scoli similar to dorsal scoli but  $\frac{1}{2}$  the length. Lateral and sublateral scoli reduced in size; yellow with trace of black on some spines and shafts. Segmental area yellow with black dot between dorsal and dorsolateral scoli. Lateral intersegmental area black and crossed by numerous yellow lines that extend length of larva: first connects distal edge of each dorsal scoli; second passes mid way between dorsal and dorsolateral scoli; third passes through base of lateral scoli; fourth passes through base of each sublateral scoli. Sublateral surface black. Ventral surface brown. Prolegs, true legs, and spiracles, reddish brown.

**Fourth instar.** Head: Diameter 2.3-2.9 mm. Reddish brown with short white secondary setae. Body: Ground color yellow. Length 22-25 mm, width 4 mm. Dorsal scoli elongated with black shafts; spines yellow with black tips. Dorsolateral, lateral, and sublateral scoli similar, but latter reduced in size. Mid-dorsal line black. Dorsal and dorsolateral surfaces yellow with three horizontal thin black intersegmental lines. Lateral and sublateral intersegmental areas and posterior and anterior of segments black with two thin horizontal white lines: first touches base of each lateral scoli; second connects sublateral scoli; both lines disrupted by yellow segmental coloration. Lateral yellow segmental areas with small black bar between dorsolateral and lateral scoli; similar but longer black line occurs just posterior of small black bar. Ventral surface brownish red. Prolegs and true legs, red. Spiracles brown.

**Fifth instar.** Head: Diameter 3.7-4.2 mm. Reddish brown with short white secondary setae. Body: Ground color yellow. Length 28-35 mm, width 7 mm. Dorsal and dorsolateral scoli with black shafts and yellow spines; some spines with black tips. Lateral and sublateral scoli reduced in size, with black shafts and yellow spines. Thin mid-dorsal line bluish gray and bordered by thin black stripe. Segmental area yellow. Intersegmental area with numerous thin horizontal stripes; progressing from the outer edge of mid-dorsal line to a point even with dorsolateral scoli, series of lines as follows: yellow, black, greenish yellow, black, yellow, black, greenish yellow, black. Three well developed inter-

segmental lines extend below these to lateral scoli: first solid white, well developed, extending from abdominal segment one (A1) to (A8); second solid black intersegmental patch extends from mesothorax (T2) to A9; third white inverted "v", connecting base of lateral scoli from A2 to A7. Sublateral and ventral surface black with a few white pinacula. Ventral intersegmental area black or red. Prolegs red, with red patch posterior to upper portion of leg. True legs, red. Spiracles light brown.

**Sixth instar.** Head: Diameter 4.9-5.9 mm. Frons black, adfrontal area and clypeus brown. Body: Ground color yellow. Length 46-57 mm, width 9-10 mm. Dorsal, dorsolateral, and lateral scoli shaft with black tips and yellow base; spines predominantly yellow, some with black tips. Sublateral scoli yellow. Mid-dorsal line bluish gray and bordered on each edge by thin black stripe. Segmental area yellow. Lateral and dorsal lateral abdominal surfaces with yellow, black, greenish yellow and white stripes as in fifth instar. A red patch with white pinacula and short white secondary setae occurs both posterior and anterior of upper proleg base. Ventral surface black with white pinacula. Mid-ventral area reddish. Prolegs and true legs red. Spiracles light brown.

The larvae of *zephyria* differ markedly from those of *A. cecrops pamina* (Neum.). Although their shapes are similar, mature *pamina* larvae are light gray-green with a few thin white, grayish, and black lines on the dorsal and dorsolateral surfaces. On the lateral surface, *pamina* has two prominent diagonal white lines that converge as they reach the lateral scoli of the succeeding segment. In *zephyria*, these two corresponding white lines are roughly parallel (Figs. 1 & 2). The ground color of the mature larva is yellow and there are numerous prominent yellow, light green, black, and yellowish green lateral lines present on the dorsolateral and lateral surfaces. At present, there is no indication that these two species occur sympatrically. *Automeris io neomexicana* B. & Benj. also occurs in New Mexico, but their larval ground color is green with a red and white lateral line extending the length of the abdomen. Thus, *zephyria* larvae are easily separated from related species. A key to the last instar *Automeris* larvae of the United States (Tuskes 1986) and color larval illustration of *zephyria* and *io* (Donahue 1979) and *cecrops pamina* (Packard 1914) have been published.

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